

### ABSTRACT

A multimode transmission system using TDMA provides a plurality of satellite services to a ground station terminal. These services include timing beacon synchronization, multi-cast/broadcast data service, calibration data, and point-to-point data service. The multimode transmission system uses a TDM switch to generate a TDMA signal having a plurality of TDMA transmission frames. Each TDMA transmission frame includes a plurality of downlink frame time slots. Each time slot may be of variable length and is dynamically allocated to an individual satellite service based upon demand. The TDMA signal is then broadcast using an advanced transmit antenna system, which requires beam-shaping and beam power control features, to enable TDMA switching between shaped beams and spot beam modes of the antenna. These antenna features allow for the dynamic partitioning of satellite system capacity between wide-area broadcasts and localized point-to-point service and efficient utilization of the satellite transmission power.

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